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Application No. 10/549,429
Filed: September 15, 2005
TC Art Unit: 1725
Confirmation No.: 9502

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A method for melting a metallic raw material in a metal molding apparatus comprising the steps of forming the metallic raw material into a cylindrical shape by casting or extrusion, inserting said cylindrical metallic raw material as a molding material into a melting cylinder provided vertically in a heating holding cylinder in said metal molding apparatus from above, and semi-melting or completely melting said cylindrical metallic raw material by a heating means set around said melting cylinder,

wherein a clearance between an inner circumferential surface of said melting cylinder and an outer circumferential surface of said cylindrical metallic raw material is previously set to a range in which said clearance does not exceed 1.0 mm with respect to an inner diameter of said melting cylinder and a diameter of said cylindrical metallic raw material during thermal expansion and said clearance allows an insertion of said cylindrical metallic raw material in a non-thermal expansion state into said melting cylinder thermally expanded at the temperature of said heating means, said diameters being calculated from a linear expansion coefficient of a metallic raw material and a linear expansion coefficient of a metallic material of the melting cylinder; and

wherein said melting cylinder is comprised of a funnel-shaped bottom portion connecting to a body portion of the melting cylinder, an outflow pipe having a smaller diameter than the body portion at the center of the bottom portion, an auxiliary heating member provided laterally in a lower portion of the body portion

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adjacent to the bottom portion of said melting cylinder, both ends of said auxiliary heating member being fixed to a body wall, and a heating means provided on the body portion and on an outer circumference of said outflow pipe, and the melting of said metallic raw material is performed by simultaneously heating of both radiant heat of the body circumference and contact heating of the bottom surface of the metallic raw material, by supporting partially the bottom surface of said cylindrical metallic raw material with the auxiliary heating member.

2. Cancelled

3. (Previously Presented) The method for melting a metallic raw material in a metal molding apparatus according to claim 1, wherein said melting cylinder is made of a metallic material having a linear expansion coefficient smaller than a linear expansion coefficient of said metallic raw material.

4. (Currently Amended) The method for melting a metallic raw material in a metal molding apparatus according to claim 21, wherein said auxiliary heating member is provided laterally at the center of a lower portion of the body portion of said melting cylinder adjacent to the bottom portion thereof so that the bottom surface of said cylindrical metallic raw material is partially supported.

5. (Currently Amended) The method for melting a metallic raw material in a metal molding apparatus according to claim 21, wherein a plurality of said auxiliary heating members are provided

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laterally across the center in a lower portion of the body portion adjacent to the bottom portion of said melting cylinder so that the bottom surface of said cylindrical metallic raw material is partially supported.

6. (Currently Amended) The method for melting a metallic raw material in a metal molding apparatus according to claim 21, wherein a heating means is provided within said auxiliary heating member and the center portion of said cylindrical metallic raw material is directly heated from a bottom surface thereof by contact between said auxiliary heating member and the bottom surface of said cylindrical metallic raw material.

7. (Currently Amended) The method for melting a metallic raw material in a metal molding apparatus according to any one of claims 1, 3 to 6 and 10 to 12, wherein said metallic raw material is made of a low melting metal alloy selected from the group consisting of:

a magnesium alloy, and
an aluminum alloy.

8. (ORIGINAL) The method for melting a metallic raw material in a metal molding apparatus according to claim 7, wherein said metallic raw material is composed of a magnesium alloy exhibiting thixotropic properties at a temperature in a solid- liquid coexisting temperature range.

9. (Previously Presented) The method for melting a metallic raw material in a metal molding apparatus according to claim 7,

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wherein the melting of said metallic raw material is performed after cutting and removing cavities generated in a surface layer of the cylindrical metallic raw material and impurities adhered to a surface of the material.

10. (Currently Amended) The method for melting a metallic raw material in a metal molding apparatus according to claim 21, wherein said melting cylinder is made of a metallic material having a linear expansion coefficient smaller than a linear expansion coefficient of said metallic raw material.

11. (Previously Presented) The method for melting a metallic raw material in a metal molding apparatus according to claim 4, wherein a heating means is provided within said auxiliary heating member and the center portion of said cylindrical metallic raw material is directly heated from a bottom surface thereof by contact between said auxiliary heating member and the bottom surface of said cylindrical metallic raw material.

12. (Previously Presented) The method for melting a metallic raw material in a metal molding apparatus according to claim 5, wherein a heating means is provided within said auxiliary heating member and the center portion of said cylindrical metallic raw material is directly heated from a bottom surface thereof by contact between said auxiliary heating member and the bottom surface of said cylindrical metallic raw material.

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13. (Previously Presented) The method for melting a metallic raw material in a metal molding apparatus according to claim 8, wherein the melting of said metallic raw material is performed after cutting and removing cavities generated in a surface layer of the cylindrical metallic raw material and impurities adhered to a surface of the material.